BALLAST PLACEMENT TIPS

Do you want your racecar to be faster? Do you want your car to be more consistent on those long runs? Getting the ballast located correctly is a key component for a faster racecar. Proper placement of the ballast is actually a free speed secret. These simple tips will allow you to go faster around the turns and provide more grip in your car.

First and foremost you should be very weight conscious when constructing your car. You would be amazed at how all of those little things add up to extra weight. Be sure to look for any weight savings. It is very difficult to find weight savings in five-pound blocks. Look for quarter pounds! Those little things will add up if you pay close attention. Strive to build a car that is as lightweight as possible. Never compromise safety for weight savings. There are plenty of places that you can save weight but safety should always be the paramount concern. We race for fun, make sure that you build a safe racecar.

Now that you have a good lightweight car you will need to add ballast to get the car up to the minimum standards set by your sanctioning body. Check your rulebook for the maximum left side weight allowed. You will want to be as close to the maximum left side weight allowed as possible while maintaining the minimum total weight. Never run your car heavy for the sake of more left side weight.

Next, check with your car builder for his recommendation on front to rear weight percentages. Verify that your car is "race ready" excluding the ballast operation. Now that you know what you want for rear weight you can begin finding a home for the ballast.

You need to locate the ballast as close to the Center of Gravity of the car and as low as possible while maintaining the minimum total weight rule, maximum left side weight rule and car builder recommended rear weight. In other words, you want the ballast to be located in the smallest area possible. Insure that you properly attach any ballast to the car. Do it right to insure safety.

For example, lets assume that your car weighs 2500 pounds race ready but without any ballast. Lets also assume that you have a 200 lb driver, your minimum weight allowed is 2900 pounds, your maximum left side is 56% and your recommended rear weight is 50%. With these assumptions you will need to add 200 pounds to get up to the minimum weight. Lets also assume that your car has 50% rear weight without any ballast installed.

We now need to mount the ballast to our hypothetical car. Since we are starting with a rear weight percentage that matches our car builder's recommendation we need to add ballast and reach our goal of 50% rear weight at the rules mandated 2900 pounds. When mounting the ballast we want to concentrate the ballast in the smallest possible area. To illustrate the point, we would want the 200 pounds of ballast to be mounted in a concentrated area within the car to meet our target. We would want to avoid placing 100 pounds near the front of the car and the other 100 pounds near the rear of the car.

By concentrating the ballast into a small area versus spreading it out your car will go faster. The same idea holds true for the left to right weight distribution as well. You want to mount the ballast in a small area rather than taking the easy route and placing some ballast in the left side frame rail and some ballast way out on the right side frame rail.

Take the extra time to build proper ballast brackets between the frame rails to attain the desired left side weight. Avoid placing ballast (or anything heavy) to the right of the Center of Gravity. You will see that your static weight numbers can be the same whether you mount the ballast in a concentrated area or if you spread out a 100 pound block on the left rail and the other 100 pound block on the right rail. Statically this will look fine on the scales but dynamically the spread out scenario will slow your car down and wear out your tires faster.

The same idea applies to front to rear weight. Avoid placing some ballast in the front of the frame rail and then another amount of ballast at the rear of the rail with an air space in between. Slide the two chunks of ballast together. Focus on concentrating the ballast into the smallest possible area and spend the time building brackets to meet the goal.

Why will the spread out ballast placement slow you down? Lets picture a simple example. Picture a playground teeter-totter. The teeter-totter pivots in the middle. The pivot is compared to the Center of Gravity in your racecar. Now picture 500 pounds of weight on both seats of the teeter-totter. The seats compare to the left and right frame rails. You can see that in the static position that the 500 pound weights would balance out. However, when you put the teeter-totter in motion that much weight would require much effort to get started and even more effort to stop once it got moving. If the teeter-totter were moving fast you would be crushed trying to stop the movement with 500 pounds out on each end. Your springs and shocks would have to control all this dynamically moving weight that is rocking back and forth. Front to rear movements would have to be controlled as well.

Now picture the same example with one revision. Instead of having 500 pounds on each seat with a balanced teeter-totter, let's move the 500 pounds in from each seat until we end up with 1000 pounds directly over the pivot point (this would be the same as our CG in our racecar). You would notice that the teeter-totter is still balanced. The weight would be carried directly at the CG or pivot point. Once the teeter-totter were put into motion it would be much easier to control compared to the spread out version that had the 500 pound weights clear out on the seats. Just think of how much easier this situation is on your springs and shocks!

By concentrating the ballast into the smallest possible area you reduce the amount of weight that has to be controlled once the car is in motion. You reduce the amount of back and forth motion in the turns and front to rear weight transitions under braking. Weight transfers occur in more controllable amounts, which will result in a more efficient, and stable handling racecar.

Another way to think of it is using your own body as an example. When you carry heavy items you hold them as close to the centerline of your body as possible. Typically you hold heavy items against your chest. With the weight against your chest you can carry the weight with less effort and you have more control once you begin moving. Most people do not carry their groceries into the house with a bag in each hand and their arms fully extended. Obviously with the weight extended way out at the end of your extended arms the groceries would be difficult to control and you could be thrown off balance very easily. Keeping the weight closer to your body or CG is much more efficient.

Now that you understand this principle lets take it another step forward. When building your car you should strive to keep all support items as close to the CG as possible. Avoid mounting the battery out on the right frame rail. Batteries are heavy and need to be located just like ballast. Try to mount all of your tanks, electrical items, fuel filters, hoses, drink bottles, radio boxes, or any support items to the left of the CG. Avoid mounting anything to the right of the CG whenever possible. Using this strategy will allow you to place more ballast in a concentrated area.

Simply by planning your mounting locations you can make your car faster by properly placing the ballast and support items. It may require more initial effort but the cost is effectively zero and the benefit keeps giving throughout the life of your racecar.

If you are conscientious mounting all of your racing components you will be able to place your ballast closer to the CG and low to the ground while still maintaining your maximum left side

weight and desired rear weight. The result of placing the ballast in a concentrated area is a racecar that is more nimble. The car will change directions much quicker. The racecar will be more responsive. Tire temperatures will be reduced, tire wear improved, lap times will go down, your car will have more grip, be more consistent and your chance for victories will rise.

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